



Jim Dulley

Thank you for your interest in writing to me about 2012 mini-split ductless air-conditioning system to be used instead of or with central systems or window units. Mini-split ductless systems are one of the few methods to cool an entire house that does not have a central ducting system. They can also be used in addition to existing central ducted air-conditioning to cool problem rooms or to zone cool the house for energy savings.

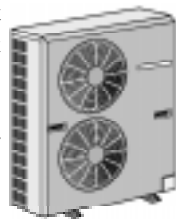
A mini-split ductless system is basically a small scale central air-conditioner with an outdoor compressor/

condenser unit and an indoor cooling/blower unit. Instead of the indoor cooling coils being in a central duct/blower system in a basement, utility room, or attic, a small cooler unit is located on a wall or ceiling in a room. Placing two or three of them throughout a house can cool the entire house. Some models are also available with heat pumps and/or electric resistance heat for winter use too.

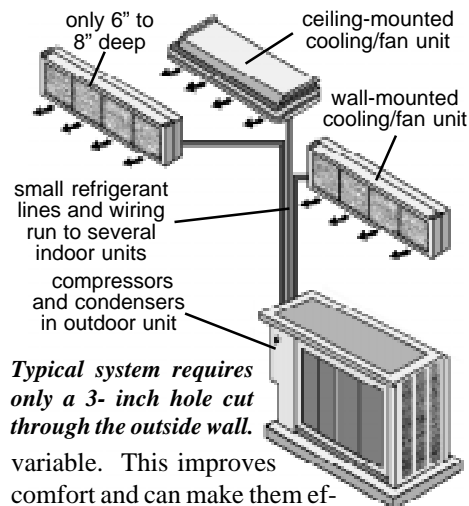


Friedrich Ductless Split System

On the following pages, I have listed the highest quality mini-split ductless systems available. The ones which use inverter compressors are most efficient. The Sanyo models don't have the highest efficiency ratings, but their heating and cooling output is



Mitsubishi two-zone Outdoor Unit



Typical system requires only a 3-inch hole cut through the outside wall.

variable. This improves comfort and can make them effectively as efficient or more than the models with higher SEER and HSPF ratings. The companies in Japan make the most advanced models because these systems are common there.

Jim

### Selected Manufacturers of Ductless Mini-Split Air-Conditioning/Heat Pump Systems

**CARRIER CORP.**, PO Box 4808, Syracuse, NY 13221 - (800) 227-7437 [www.carrier.com](http://www.carrier.com)

#### Cool only units

model - "QNC" series — wall mount\*  
model - "QAC" series — ceiling mount  
model - "QKC" series — in-ceiling

cooling - 8,500 to 22,600  
cooling - 18,000 to 58,500  
cooling - 18,300 to 34,400

\*\* SEER - 13.0  
SEER - 13.0  
SEER - 13.0

#### Heat pump units

model - "QNC" series — wall mount cooling/heating - 8,700 to 23,000 / 9,000 to 21,000 \*\* SEER/HSPF - 13.0 / 7.7  
model - "QAC" series — ceiling mount cooling/heating - 19,000 to 58,000 / 17,000 to 57,500 SEER/HSPF - 13.0 / 7.7  
model - "QKC" series — in-ceiling cooling/heating - 18,000 to 34,400 / 17,600 to 34,000 SEER/HSPF - 13.0 / 7.7  
multi-zone systems - There are dual-, tri- and quad-zone systems available.

features - The wireless remote has an automatic shift of fan speed, sleep mode — slowly raises temperature at night, 24-hour timer, time of day, sensor dry and automatic operation, high sensitive IC-thermostat and 3-minute delay circuit to prevent a fuse from blowing. The air handlers are quiet and equipped with four-way deflectors to direct air in any angle. There is an automatic restart after power failure. There is electric backup heat on several models and auto change over on the heat pump units. The indoor and outdoor units can be placed up to 49 feet apart. Bryant (owned by the same company as Carrier) offers almost identical models.

**EMI**, 5780 Success Dr., Rome, NY 13440 - (800) 228-9364 [www.enviromaster.com](http://www.enviromaster.com)

#### Cool only units

model - "KWC" — wall mount  
model - "FHP" — floor mount  
model - "CHP" — ceiling mount  
model - "CAH" series — in-ceiling  
model - "TBH" — drop-in ceiling

cooling - 9,000 to 36,000  
cooling - 9,000 to 48,000  
cooling - 9,000 to 36,000  
cooling - 9,000 to 48,000  
cooling - 9,000 to 24,000

SEER - 13.0  
SEER - 13.0  
SEER - 13.0  
SEER - 13.0  
SEER - 13.0

#### Heat pump units

model - "KWH" — wall mount  
model - "VCH" — in-wall

cooling/heating - 9,000 to 36,000 / 9,000 to 35,000 SEER/HSPF - 13.0 / 7.7  
cooling/heating - 18,000 to 38,000 / 17,500 to 28,000 SEER/HSPF - 13.0 / 7.7

multi-zone systems - There are dual-, tri- and quad-zone systems available.

features - There are power induced fresh air options. The "WHP" series has unit mounted digital controls. Options include a digital remote control, condensate pump and electric heat options to 5 kW. The units have a nice profile featuring a perforated intake grille and manually adjustable discharge vanes. The "CAH" series has motorized air distribution vanes for sweep or set directions, fresh air and condensate pump, branch knockouts for secondary outlets and electric heat. The "CHP" also has fresh air knockout sections and optional electric heat to 10kW. It is a ceiling mounted evaporator for applications where fully exposed or partially recessed cabinetry can be used. For partially recessed mounting, these units easily adapt to standard T-bar, drop ceiling openings. It is designed for applications where the unit may be concealed in soffits or other structural spaces with only the intake and discharge grilles exposed. The aluminum supply air louvers are dual adjustable for air flow direction, to provide air flow throws to suit any installation. The "TBH" unit has an attractive intake/discharge grille that replaces any two by four foot ceiling panel and only electric wiring and refrigerant tubing is needed between the ceiling unit and the outside condensing unit. Sea coast coated coil options are a good choice for corrosive environments. Models are designed for 100-foot maximum tubing runs. Hydronic heat, hot water and steam is available on several models.

\* This is the capacity in Btuh. Btuh means Btu's of cooling or heating output per hour.

\*\* SEER is the cooling efficiency rating for an air conditioner or heat pump. HSPF is the heating efficiency rating for a heat pump in the heating mode.

**FRIEDRICH AIR CONDITIONING CO.**, PO Box 1540, San Antonio, TX 78295 - (800) 541-6645 (210) 357-4400 www.friedrich.com

**Cool only units**

<u>model</u> - "M18CF" — wall mount	<u>cooling</u> - 18,000	<u>SEER</u> - 19.0
<u>model</u> - "S36CF" — ceiling mount	<u>cooling</u> - 34,100	<u>SEER</u> - 14.0

**Heat pump units**

<u>model</u> - "M18YF" — wall mount	<u>cooling/heating</u> - 18,000 / 21,600	<u>SEER/HSPF</u> - 19.0 / 9.0
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multi-zone systems - There are two, three and four-zone systems available.

features - These use inverter compressors. The "M" series has a microcomputer for exact temperature control. The electronics system controls constantly monitor and maintain your selected settings so you will always be comfortable. There are multiple operation modes — regular cooling, economy cooling with extra dehumidifying, heating and air circulation. There are three fan speeds plus an auto-fan mode. The LCD remote control allows on/off timer and 24-hour programming. LCD indicates — operating mode, set temperature, room temperature, timer settings, fan speed and clock. There are 4-way adjustable air louvers (up/down, left/right) to direct the air to meet your cooling needs. A three minute time delay guards against compressor damage. Most models have built-in controls that allow the unit to cool even when outdoor temperatures fall to 0° F. The "S" series is a universal system that provides for more mounting options. You can choose the ceiling mounted unit (can also be mounted to the floor) or the ceiling suspended unit. The wireless remote controller allows for easy 24-hour programming and sleep timer. There are four-way adjustable air louvers with auto-shut flaps. The unit's controller is programmed for automatic restart in the event of power loss. All units come with washable, reusable air filters.

**FUJITSU GENERAL AMERICA**, 353 Route 64 W., Fairfield, NJ 07004 - (888) 888-3424 (973) 575-0380 www.fujitsugeneral.com

**Cool only units**

<u>model</u> - "RLS" series — wall mount	<u>cooling</u> - 9,000/12,000/15,000	<u>SEER</u> - 26/25/21
<u>model</u> - "RSLX" series — ceiling mount	<u>cooling</u> - 34,100	<u>SEER</u> - 14.0

**Heat pump units**

<u>model</u> - "9RLQ" — wall mount	<u>cooling/heating</u> - 9,000	<u>SEER/HSPF</u> - 21.0 / 11.0
<u>model</u> - "RULX" series — universal mount	<u>cooling</u> - 18,000 to 22,000 / 21,000 to 24,000	<u>SEER/HSPF</u> - 16.0 / 8.5

multi-zone systems - There are dual-zone systems available.

features - These use super-efficient inverter-technology compressors. The LCD digital wireless remote on certain models allows you to select the type of operation you desire — auto, fan, sleep, dry or energy saver mode. The AI (artificial intelligence) technology lets the unit automatically regulate the indoor air when placed on auto mode. Timer functions include the sleep timer, 24-hour programmable timer and AI room prep timer. The room ready timer function automatically turns the unit on beforehand so the room reaches the desired temperature by the set time. There are four choices of fan speed — high, medium, low and quiet. The LCD display shows operating modes, temperature settings, fan speed selections, timer and clock functions. If there is a temporary power failure the unit will automatically restart in the same operating mode as before. There is a built-in filter check lamp to show when it is time to clean the filter. The front cover is easily removed for access to the reusable filter for cleaning. Some models have automatic swing air flow while others have a 4-way manual air flow adjustment. The units have an ultra-quiet compressor and fan coil technology to keep operating noise levels to a minimum. The indoor units are stylish and blend nicely to match your decor. See page 4 for more details and illustrations. The front grilles can be removed easily without tools for cleaning. System "22U" has the option of being installed either on the floor, wall or ceiling, depending on the desired or necessary installation requirement. The universal and ceiling-mount units have horizontal and vertical automated air sweeps that can be operated from the remote control. You can also choose varying degrees of air flow angles. The heat pump units provide an automatic change-over from cooling to heating or vice versa. The dual-zone system comes with two remotes, two independent circuits and two separate compressors.

**GOODMAN MFG. CORP.**, 2550 N. Loop West, Houston, TX 77092 - (877) 254-4729 (713) 861-2500 www.goodmanmfg.com

**Cool only units**

<u>model</u> - "MSG" series — wall mount	<u>cooling</u> - 12,000 to 24,000	<u>SEER</u> - 13.5
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**Heat pump units**

<u>model</u> - "MSG" series — wall mount	<u>cooling/heating</u> - 12,000 to 24,000 / 13,000 to 25,000	<u>SEER/HSPF</u> - 13.5 / 7.7
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features - The units are available with a wireless remote control that allows you to take total control of the system and provides you with programmable time and temperature control. The microprocessor control provides a 12-hour timer with an energy savings sleep mode. The unit is equipped with a 3-speed motor and the single blower design assures quiet operation. There is maximum air flow through the multi-flap 4-way discharge louvers. The permanent filters are easy to remove for washing and cleaning — helps to remove airborne dust and keeps the system operating at maximum capacity and efficiency. The sleek, contemporary styling of the indoor unit allows for a stylish appearance and easy cleaning. The compact design of the outdoor system has horizontal discharge air flow. The narrow footprint makes it ideal for ground level, rooftop or wall mounting. The isolated compressor compartment keeps noise levels to a minimum.

**LG**, 1000 Sylvan Ave., Englewood Cliffs, NJ 07632 - (800) 865-3026 www.lg-dfs.com

**Available in Cool-only and Heat pump units**

<u>model</u> - "Art Cool Premier" — wall mount	<u>cooling/heating</u> - 9,000 and 12,000	<u>SEER/HSPF</u> - 28.0/12.0
<u>model</u> - "Art Cool" — wall mount	<u>cooling/heating</u> - 9,000 and 36,000	<u>SEER/HSPF</u> - 21.0/11.0

features - Units come with an LCD remote controller or optional wall-mounted controller. User can choose from auto, cool, dry, fan or heat (heat pump models only) mode. An auto fan speed control automatically selects the fan speed based on indoor conditions to achieve optimum cooling or heating performance and cost efficiency. The self diagnosis function detects and diagnoses system faults using blinking led lights. The unit will automatically restart at the last setting in the event of a power failure. Two-stage purifying air filtration system to ensure fresh, odorless air. It has a "Jet" function to rapidly cool at maximum compressor speed and high fan speed. These models use inverter compressor technology. I use a 9,000 Btuh heat pump model in my own bedroom. It is very quiet on the low fan setting for sleeping.

**MITSUBISHI ELECTRONICS**, 3100 Avalon Ridge Pl., Suite 200, Norcross, GA 30071 - (800) 433-4822 www.mrslim.com

**Cool only units**

model - "MS-A09WA" — wall mount	cooling - 9,500	SEER - 13.0
model - "MSY-A15NA" — wall mount	cooling - 15,000	SEER - 16.0
model - "MSY-A24NA" — wall mount	cooling - 22,200	SEER - 16.0
model - "MSY-A17NA" — wall mount	cooling - 16,200	SEER - 16.0

**Heat pump units**

model - "MXZ-2A20NA" — wall mount	cooling/heating - 9,000 / 10,900	SEER/HSPF - 17.0 / 8.2
model - "MSZ-FD09NA" — wall mount	cooling/heating - 9,000 / 10,900	SEER/HSPF - 23.0 / 10.5
model - "MSZ-FD12NA" — wall mount	cooling/heating - 12,000 / 13,600	SEER/HSPF - 22.0 / 10.5
model - "Mr. Slim PLH" — wall mount	cooling/heating - 22,200 / 23,200	SEER/HSPF - 16.0 / 8.2

**multi-zone systems** - Dual- and triple-zone systems are available.

**features** - The outdoor compressor (uses inverter rotary design) unit can be mounted almost anywhere within 50' on the smaller units and up to 160' away from the larger indoor units. The wireless remote controller has operation mode settings. I feel too cool or too warm allows you to adjust the temperature instantly to reach your desired comfort level. Computerized dehumidification in the dry mode places the system on priority dehumidification rather than temperature control. There is also a night setback mode, energy-saving cooling feature, 3-speed or automatic fan control, 24-hour on/off timer (operation can be set to start or stop after a specified time in one-hour units from 1 to 24), self-diagnostic display and vane control. The angle of the air outlet vanes can be adjusted. Choose from auto (automatically adjusts the angle), swing vane mode or adjust manually for precision directional flow. There are five different vertical airflow angles that can be selected to match the room layout and the location of people. The heat pump units start with a low fan speed to prevent the unit from blowing cold air into the room. When the blower first comes on you will get warm air. The microprocessor controlled booster heater speeds the warming process. Some heat pump models have backup electric resistance heat for extremely cold weather. The "MS" series has an indoor unit that is only 32 inches wide by 11 inches tall by 7 inches deep and weights less than 18 pounds. A high efficiency outdoor unit is available in combination with the P-series indoor units. This system will attain heating and cooling ranges from 18,000 to 42,000 Btu's and a Seer rating of 12.0.

**SAMSUNG ELECTRONICS**, 2865 Pellissier Place, Whittier, CA 90601 - (562) 463-0880 www.quietside.com

**Heat pump units**

model - "AQV09" — wall mount	cooling/heating - 9,000 / 11,950	SEER/HSPF - 20.0 / 10.0
model - "AQV12" — wall mount	cooling/heating - 12,000 / 13,600	SEER/HSPF - 19.0 / 9.0
model - "AQV18" — wall mount	cooling/heating - 18,000 / 20,500	SEER/HSPF - 17.0 / 8.0
model - "AQV24" — wall mount	cooling/heating - 24,000 / 27,000	SEER/HSPF - 15.5 / 7.8

**multi-zone systems** - All use inverter rotary compressors. Dual- and triple-zone systems are available.

**features** - Wireless handheld remote control operation available for all units. A wall mounted controller is available with the "ACH" series in-ceiling unit. In addition to the standard mode, four different air conditioning modes can be selected according to the user's preferences. "Nature mode" keeps the temperature differential between indoors and outdoors to make a comfortable environment. "Power mode" enables you to reach any desired temperature rapidly. It is most useful immediately after returning home. "Power saving mode" saves energy and electricity by reducing unnecessary usage. "Silent mode" maintains a quiet environment as it controls the RPM of the fan. A dehumidification mode can be selected to reduce moisture levels in the room. A turbo mode can be selected for both cooling and heating operation. This is used to quickly bring room temperature to desired level. The unit will operate for 30 minutes, regardless of room temperature, then will resume in standard mode. The automatic restart feature will automatically restart the unit in the last operating mode in the event of a power failure. Auto swing louvers direct airflow to all corners of the room. The units are equipped with three-stage filters — an antibacterial filter, an electrostatic filter and a deodorizing filter. The internal components are molded with an antibacterial formula which prevents the proliferation of fungi and bacteria within the unit. It helps to keep the unit clean, blocks odors from developing and also extends its life span. If the unit is to operate in ambient temperatures below 68 degrees, a low ambient kit is available to prevent freezing of the evaporator. Indoor free standing floor units are also available which vent outdoors through the wall.

**SANYO AIR CONDITIONING PROD.**, 21605 Plummer St., Chatsworth, CA 91310 - (818) 998-7322 www.sanyohvac.com

**Cool only units**

model - "09K" — wall mount	cooling - 9,000	SEER - 16.0
model - "18K" — wall mount	cooling - 17,500	SEER - 16.0
model - "26TW" — ceiling mount	cooling - 24,400	SEER - 15.0

**Heat pump units**

model - "09KH" — wall mount	cooling/heating - 9,000 / 12,200	SEER/HSPF - 16.0 / 7.7
model - "18KH" — wall mount	cooling/heating - 17,500 / 20,400	SEER/HSPF - 16.0 / 7.7
model - "26THW" — ceiling mount	cooling/heating - 24,400 / 30,800	SEER/HSPF - 16.0 to 10.4

**multi-zone systems** - There are dual- and triple-zone systems available. See page 4 for more details.

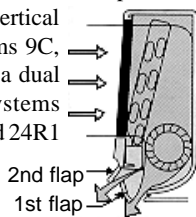
**features** - These units use inverter rotary compressor technology which provides for variable cooling output. The units have an LCD wireless remote control for all the functions — time of day, current room temperature, set temperature, fan speed and night setback for a comfortable night's sleep, auto-louver (oscillates the air discharge vane up and down for even air distribution) or timer functions if selected. There is a 24-hour on/off program timer which includes automatic 1-time daily on/off setting, off timer, on timer and combination timer to help you save energy by operating the unit only when needed. There is a power failure automatic restart. The automatic fan mode adjusts the fan speed to high, medium or low accordingly to the room temperature to maintain your comfort settings. The microcomputer controlled system is constantly monitoring time and temperature against preset conditions for energy cost savings and to maintain the room temperature. The washable filters can be removed without tools. The heat pumps have a hot start heating system — prevents any cold blasts at the beginning while the heat pump is warming up.

### Features of the Fujitsu Ductless Mini Split Systems

**Auto Louver Function** — Enhances the air distribution by enabling you to automatically set a gentle, air sweep motion in various patterns from the remote control. A vertical louvered motion for systems 9C, 12C1, 9R1 and 12R1; and a dual louvered function for systems 18C1, 24C1, 30C, 18R1 and 24R1 provide improved air flow.

**Power Diffuser** — Triggered by the maximum auto louver function; this additional louver opens based on Artificial Intelligence (AI) technology monitoring sensor to meet comfort needs.

**Super Vane Design** — A double flap configura-



tion boosts airflow, sending air to every corner of the room.

**Sleep Function** — Automatically adjusts the temperature while you sleep to make you more comfortable. Smaller models also incorporate an extra quiet fan speed.

**Dry Mode** — Is used to help control humidity levels when cooling may not be needed.

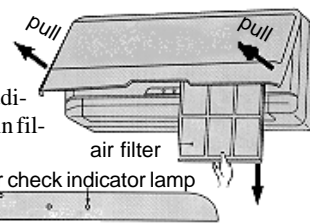
**Energy Saver Mode** — Allows the unit to keep your room cool enough for comfort by using a relaxed thermostat setting automatically, reducing power consumption.

**Moderate Low Ambient Operation** — This additional feature allows the system to operate indoors even when outdoor ambient tempera-

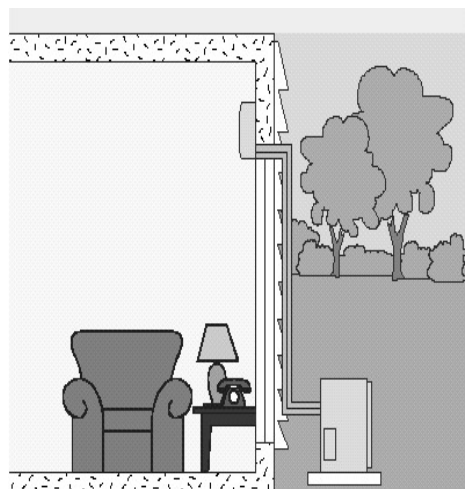
tures are 32°F; without any additional accessory.

**Auto Restart** — In the event of a temporary power failure the air conditioner will automatically restart in the same operating mode as before, once power has been restored.

**Filter Check Timer** — The front cover is easy to remove, making air filter cleaning simple. In addition, the built-in filter check lamp indicates when it is time to clean the filter.



### Ductless Mini Split System by Friedrich



- The compact, suitcase-style outdoor units can be installed anywhere.
- Electrical knockouts provide for utility connects and wiring between units.
- Flare fittings permit quick installation with no brazing.
- End panel is easily removed for installation and routine inspection.
- The indoor units require only a 3 inch hole for connecting to outdoor condensing unit.
- Two indoor units connected to a single outdoor unit can be used to cool adjoining rooms, a long narrow room, or for backup in remote areas.
- Each unit is independently controlled for optimum zone cooling flexibility.

### Mitsubishi Remote Control Features

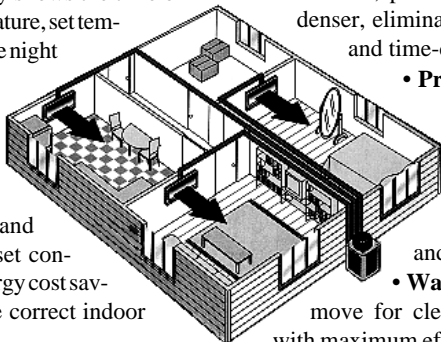
- The 24-hour on/off timer allows you to program the exact times you want the unit to operate so energy is not wasted.
- Three-speed or automatic fan control.
- In dry mode, system places priority on dehumidification rather than temp control.
- Easy-to-read digital display indicates the set temperature in increments of 2°F.
- The "I Feel" temperature control allows you to adjust the temperature instantly with one tap of a button. Simply select "Too Warm" or "Too Cool" to achieve the desired comfort level.
- Auto/swing vane mode quickly heats or cools down a room by distributing air high or low to ensure best air distribution, or operate manually by choosing from five different angles for precise directional flow.



### Tri-Zone Air Conditioners by Sanyo

#### Standard Features

- **Tri-Zone design** — means the 3 indoor evaporators are each connected to the same outside high-performance condenser through a 3 1/2" wall opening.
- **Single outside condenser** — utilized 3 separate rotary compressors and refrigerant circuits for maximum efficiency.
- **Wireless remote control** — with large LCD screen controls all 3 indoor units and permits user to select all functions and the desired room temperature setting from anywhere in the room. The liquid crystal display shows the time of day, current room temperature, set temperature, fan speed and the night setback, auto-louver or timer functions if selected.
- **Microcomputer-controlled system** — constantly monitors time and temperature against preset conditions for maximum energy cost savings as well as to ensure correct indoor temperature at all times.



- **24-hour on/off program timer** — allows you to set various time-based functions including automatic one-time/daily on/off setting, off timer, on timer and combination timer.
- **Full width centrifugal blower** — distributes a quiet, even flow of conditioned air to the room from the indoor evaporator.
- **Ductless mini-split system** — means speedier, less costly installation (than adding ducts for central air-conditioning) and very quiet operation. The ultra-quiet wall-mounted evaporator is connected through a 3 1/2" wall opening to an innovative, powerful yet quiet outdoor condenser, eliminating the need for expensive and time-consuming ductwork.

• **Preservation of security and view** — since window space and large wall openings are not required for these split system installations, building safety is enhanced and the view preserved.

• **Washable filters** — easy to remove for cleaning without tools. Helps with maximum efficiency.

### Savings by Installing a New Ductless Mini-Split Air Conditioner

SEE	Approx. Annual Operating Cost — \$							
6.0	200	300	400	500	600	700	800	900
7.0	175	260	345	430	515	600	690	780
8.0	150	225	300	375	450	525	605	685
10.0	120	180	240	300	360	420	485	550
12.0	100	150	200	250	300	350	400	450
14.0	90	130	170	215	260	300	345	390
16.0	75	110	150	185	225	260	300	340
18.0	70	100	135	170	200	230	270	305
20.0	60	90	120	150	180	210	240	275
22.0	55	80	110	140	165	190	220	250

**To use this chart** — Estimate the approximate SEER efficiency of your current air conditioner. Check with your contractor. Then locate your current annual operating costs. Look down in the same column across from the new efficiency for new operating cost.

**Example** — If your current air conditioner has a SEER of 6.0 and its annual operating (electricity) cost is \$500, the cost to operate a new 20.0 SEER air conditioner will be about \$150, an annual savings of \$350.